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| 10/800,696 | 03/16/2004 | Luc Adriaenssens | 4799-0114P | 1659 |
| 2292 | 7590 | 05/19/2006 | EXAMINER | |
| BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747 | | | SEMENENKO, YURIY | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2841 | |

DATE MAILED: 05/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/800,696

Applicant(s)

ADRIAENSSENS ET AL.

Examiner

Yuriy Semenenko

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 39-50 and 56-97 is/are pending in the application.
- 4a) Of the above claim(s) 47-50, 58 and 64-97 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 39-46, 56, 57 and 59-63 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 3/16/048/1904::
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. Amendment filed on 03/07/2006 has been entered.

In response to the Restriction requirement dated 02/07/ 2005, Applicants have amended claim 49.

Claims 1-38 and 51-55 have been cancelled. Claims 59-97 are newly added.

Claims 39-50 and 56--97 are now pending in the application.

Election/Restrictions

2.1. Applicant's election of Group I, claims 39-46, 56-57 and 59-97 in the reply filed on 03/07/2006 is acknowledged. Claims 47-50 and 58 have been withdrawn from consideration.

2.2. Applicant must withdraw new claims 64-97 drawn to an apparatus for reason as state follow:

2.2.1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 39-46, 56-57 and 59-63 drawn to a printed circuit board (PCB) structure, classified in class 174, subclass 258.
- II. Claims 64--97 drawn to an apparatus, classified in class 174, subclass 258.

The inventions are distinct, each from the other because of the following reasons:

2.2.2. Inventions group II and group I are related as combination and subcombination.

Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because combination (an apparatus) may work without subcombination (a printed circuit board) as claimed in

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claims 39-50, 56—57 and 59-63 but instead of using a printed circuit board with second capacitors are not interdigital capacitor The subcombination (a printed circuit board (PCB)) has separate utility such as in devices which does not required a second conductive path electrically connecting said second capacitor to said portion of said first contact of said plurality of contacts.

2.2.3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

2.1. Applicant's election with traverse of Species A in the reply filed on 03/07/2006 is acknowledged. The traversal is on the ground(s) that:

Examiner fails to include specie VI (F). Applicant's arguments that specie VI (F) should be presented for the plate-type capacitors are found persuasive. However, in instant case, Applicant elected Group I and election of the Specie would be effected to examination if Applicant elect Group II (claims 64—97) directed to specie.

Nevertheless Group II (claims 64—97) of this application contains claims directed to the corrected as follow patentably distinct species of the claimed invention:

| | |
|------------|---|
| Specie I | Figure 1(a): a single structured printed circuit board (PCB) |
| Specie II | Figure 1(a): a printed circuit board (PCB) with five substrates |
| Specie III | Specification [0034] and Fig. 3(a): a printed circuit board (PCB) with four substrates |
| Specie IV | Specification [0023] and Fig. 4(a): printed circuit board (PCB) includes first and second PCB |
| Specie V | Figure 4B: a printed circuit board (PCB) structure with the interdigital capacitors |
| Specie VI | Figure 2: a printed circuit board (PCB) structure with the plate-type of capacitors |

Double Patenting

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claim 1 provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. 10845104. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 discloses a ratio of the first magnitude of the first compensation structure to the second magnitude of the second compensation structure varies with frequency and claim 1 of copending Application No. 10845104 discloses limitation "the second compensation structure having increased capacitance with increasing frequency" and still reads on claim 1.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4.1. Claim 39-46, 56, 57 and 59-63 are rejected under 35U.S.C. 103(a) as being unpatentable over Aekins (Patent # 6057743) hereinafter Aekins in view of Ninomiya (PGPub #2001/0048592) hereinafter Ninomiya.

As to claim 39: Aekins discloses in Fig. 1 a printed circuit board 20 for providing crosstalk compensation in an electrical connector 10, comprising: a plurality of conductive traces 22- 28; a first compensation structure 30a providing a first crosstalk compensation signal having a first magnitude to a first 22 of the plurality of conductive traces; and a second compensation structure 30b providing a second crosstalk compensation signal having a second magnitude to the first 22 of the plurality of conductive traces,

except Aekins does not teach a ratio of the first magnitude to the second magnitude varies with frequency.

Ninomiya teaches using for high-speed signal line decoupling capacitor with material with dielectric constant different to dielectric constant of the material for capacitor for low-speed line (for power supply) (page 3, [0048], [0049] and [0050]). In such structure a ratio of the first magnitude to the second magnitude varies with frequency. Aekins also teaches that crosstalk signals can be controlled by appropriate adjustment of the dielectric constant of the printed wiring board (column 4, lines 44-54), at time the invention was made, it was well known to use for different signal lines compensation structures with different magnitudes.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made for Aekins to include in his invention a ratio of the first magnitude to the second magnitude varies with frequency to provide crosstalk compensation.

As to claim 56: Aekins discloses in Fig. 1 a printed circuit board 20 for an electrical connector 10, the printed circuit board comprising: a plurality of conductors 22-28; a first capacitor (capacitor included in first compensation structure 30a), electrically connected to a first of the conductors 22, the first capacitor having a first dielectric with a first dielectric constant slope; and a second capacitor (capacitor included in second compensation structure 30b) electrically connected to the first of the conductors 22 (the first of the conductors 22 electrically connected to the second capacitor through the first compensation structure 30a), the second capacitor having a second dielectric with a second dielectric constant slope.

except Aekins does not teach a first dielectric constant slope is different with a second dielectric constant slope.

Ninomiya teaches using for high-speed signal line decoupling capacitor with material with dielectric constant different to dielectric constant of the material for capacitor for low-speed line (for power supply) (page 3, [0048], [0049] and [0050]). So a first dielectric constant slope is different with a second dielectric constant slope.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made for Aekins to include in his invention a first dielectric constant

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slope is different with a second dielectric constant slope to provide crosstalk compensation.

Although, Aekins does not explicitly teach that a difference between the first dielectric constant slope and the second dielectric constant slope is at least 0.15 per decade of frequency, but materials which applicant teaches to use in present application such as FR-4 or Teflon or product of the Nelco was well-known to use for substrate for PCB as evidenced by Pai et al. (PGPub #2003/0174484) hereinafter Pai (page 4, [0032] and (<http://www.cirexx.com/info/pdf/n4000-7.pdf>). All of this materials are capable of performing the intended use (provide a difference between the first rate of decline and the second rate of decline is in the range of about 0.15 to about 0.45 per decade of frequency) and then it meets the claim 56. See *In re Casey*, 152 USPQ 235 (CCPA 1967) AND *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made for Aekins to include in his invention that wherein a difference between the first dielectric constant slope and the second dielectric constant slope is at least 0.15 per decade of frequency, motivated by its known suitability for its intended use. See MPEP §2144.07.

As to claim 59: Aekins discloses in Fig. 1a printed circuit board 20 comprising: a plurality of conductive paths 22-28 that extend from a plurality of respective inputs 11-14 of said printed circuit board 20 to a plurality of respective outputs 15-18 of said printed circuit board; a first compensation stage 30a for capacitively coupling crosstalk compensation having a first polarity onto a first path 22 of said plurality of conductive paths, said first compensation stage including at least one first capacitive element (capacitor included in first compensation structure 30a) that includes a first dielectric constant material that has a first rate of change with frequency; and a second compensation stage 30b for capacitively coupling crosstalk compensation having a second polarity onto said first path 22 of said plurality of conductive paths, said second compensation stage including at least one second capacitive element (capacitor

included in second compensation structure 30b) that includes a second dielectric constant material that has a second rate of change with frequency.

except Aekins does not teach that a first rate of change with frequency is different with the second rate of change with frequency.

Ninomiya teaches using for high-speed signal line decoupling capacitor with material with dielectric constant different to dielectric constant of the material for capacitor for low-speed line (for power supply) (page 3, [0048], [0049] and [0050]). So a first rate of change with frequency is different with the second rate of change with frequency.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made for Aekins to include in his invention first rate of change with frequency is different with the second rate of change with frequency to provide better crosstalk compensation.

Although, Aekins does not explicitly teach that the first rate of change and the second rate of change differ by between about 0.15 to about 0.45 per decade of frequency but materials which applicant teaches to use in present application such as FR-4 or Teflon or product of the Nelco was well-known to use for substrate for PCB as evidenced by Pai et al. (PGPub #2003/0174484) hereinafter Pai (page 4, [0032] and (<http://www.cirexx.com/info/pdf/n4000-7.pdf>)). All of this materials are capable of performing the intended use (provide that the first rate of change and the second rate of change differ by between about 0.15 to about 0.45 per decade of frequency) and then it meets the claim 59. See In re Casey, 152 USPQ 235 (CCPA 1967) AND In re Otto, 136 USPQ 458, 459 (CCPA 1963).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made for Aekins to include in his invention that wherein the first rate of change and the second rate of change differ by between about 0.15 to about 0.45 per decade of frequency, motivated by its known suitability for its intended use. See MPEP §2144.07.

Although, Aekins does not explicitly teach a first compensation stage 30a for capacitively coupling crosstalk compensation having a first polarity and a second

compensation stage 30b for capacitively coupling crosstalk compensation having a polarity opposite the first polarity, Applicant recited in specification (page 17, [046]) that deploying of oppositely polarized two compensation stages is a conventional 2-stages compensation system (page 4, [0048]).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made for Aekins to include in his invention that a first compensation stage for capacitively coupling crosstalk compensation having a first polarity and a second compensation stage for capacitively coupling crosstalk compensation having a polarity opposite the first polarity to remove the noise component, according to Fourier's wave theory and Maxwell's theory of electromagnetic fields (Aekins, Background of the Invention).

As to claims 40-45, 57, 60, 61, 62: Aekins, as modified, discloses a printed circuit board having all of the claimed features as discussed above with respect claim 39 (56, 59), the first compensation structure comprises a capacitor (capacitor included in first compensation structure 30a, Fig.1) that includes a first dielectric constant material having a first rate of decline with frequency, and wherein the second compensation structure comprises a capacitor (capacitor included in first compensation structure 30a, Fig. 1) that includes a second dielectric constant material having a second rate of decline with frequency,

except Aekins does not teach a first rate of decline with frequency is different with a second rate of decline with frequency.

Ninomiya teaches using for high-speed signal line decoupling capacitor with material with dielectric constant different to dielectric constant of the material for capacitor for low-speed line (for power supply) (page 3, [0048], [0049] and [0050]). So a first rate of decline with frequency is different with a second rate of decline with frequency.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made for Aekins to include in his invention a first rate of decline with frequency is different with a second rate of decline with frequency.

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Although, Aekins does not explicitly teach that a difference between the first rate of decline and the second rate of decline is in the range of about 0.15 to about 0.45 per decade of frequency, as claimed in claim 40, or the first rate of decline is about 0.2 per decade of frequency across the frequency range of 1 MHz to 1GHz. as claimed in claim 41, or the first rate of decline is about 0.4 per decade of frequency across the frequency range of 1 MHz to 1GHz. as claimed in claim 42, the second rate of decline is substantially flat with frequency across the frequency range of 1 MHz to 1GHz. as claimed in claim 43, but materials which applicant teaches to use in present application such as FR-4 or Teflon and product of the Nelco was old and well-know to use for substrate for PCB as evidenced by Pai et al. (PGPub #2003/0174484) hereinafter Pai (page 4, [0032]. All of this materials are capable of performing the intended use (provide a difference between the first rate of decline and the second rate of decline is in the range of about 0.15 to about 0.45 per decade of frequency, as claimed in claim 40, or the first rate of decline is about 0.2 per decade of frequency across the frequency range of 1 MHz to 1GHz. as claimed in claim 41, or the first rate of decline is about 0.4 per decade of frequency across the frequency range of 1 MHz to 1GHz. as claimed in claim 42, the second rate of decline is substantially flat with frequency across the frequency range of 1 MHz to 1GHz. as claimed in claim 43) and then it meets the claims. See In re Casey, 152 USPQ 235 (CCPA 1967) AND In re Otto, 136 USPQ 458, 459 (CCPA 1963).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made for Aekins to include in his invention that a difference between the first rate of decline and the second rate of decline is in the range of about 0.15 to about 0.45 per decade of frequency, as claimed in claim 40, or the first rate of decline is about 0.2 per decade of frequency across the frequency range of 1 MHz to 1GHz. as claimed in claim 41, or the first rate of decline is about 0.4 per decade of frequency across the frequency range of 1 MHz to 1GHz. as claimed in claim 42, the second rate of decline is substantially flat with frequency across the frequency range of 1 MHz to 1GHz. as claimed in claim 43. Motivated by its known suitability for its intended use. See MPEP §2144.07.

As to claim 63: Aekins, as modified, discloses a printed circuit board having all of the claimed features as discussed above with respect claim 59, wherein the first and second rates of change are pre-selected to reduce the near-end crosstalk on said first path of said plurality of conductive paths in the 1 MHZ to 100 MHZ frequency range (column 1, lines 27-46) when a plug is electrically connected to said plurality of respective inputs.

Although, Aekins does not explicitly teach to use a high crosstalk plug is electrically connected to said plurality of respective inputs in the 1 MHZ to 100 MHZ frequency range and to use a low crosstalk plug is electrically connected to said plurality of respective inputs at frequencies above 250 MHZ, Applicant discloses in the "Background of the invention" section, at the time the invention was made, it was well know to use a high crosstalk plug is electrically connected to said plurality of respective inputs in the 1 MHZ to 100 MHZ frequency range and to use a low crosstalk plug is electrically connected to said plurality of respective inputs at frequencies above 250 MHZ (specification, page 3, [006]).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made for Aekins to include in his invention that wherein the first and second rates of change are pre-selected to reduce the near-end crosstalk on said first path of said plurality of conductive paths in the 1 MHZ to 100 MHZ frequency range (column 1, lines 27-46) when a high crosstalk plug is electrically connected to said plurality of respective inputs, and to reduce the near-end crosstalk on said first path of said plurality of conductive paths at frequencies above 250 MHZ when a low crosstalk plug is electrically connected to said plurality of respective inputs to satisfy standards of Electronic Industry association (EIA) as taught by Aekins (Page 1, 27-35).

As to claim 46: Aekins, as modified, discloses a printed circuit board having all of the claimed features as discussed above with respect claim 39 ,

Although, Aekins does not explicitly teach the first crosstalk compensation signal and the second crosstalk compensation signal have different polarities and wherein a time

delay is present between the first and second compensation signals, Applicant recited in specification (page 17, [046]) that deploying of oppositely polarized two compensation stages is a conventional 2-stages compensation system (page 4, [0048]).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made for Aekins to include in his invention that the first crosstalk compensation signal and the second crosstalk compensation signal have different polarities and wherein a time delay is present between the first and second compensation signals to remove the noise component, according to Fourier's wave theory and Maxwell's theory of electromagnetic fields (Aekins, Background of the Invention).

Relevant Art

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Chen – US Patent # 6483715.

6.1. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yuriy Semenenko whose telephone number is (571) 272-6106. The examiner can normally be reached on 8:30am - 5:00pm.

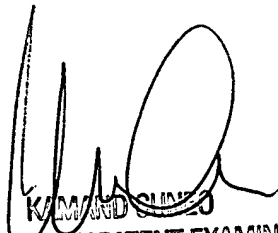
6.2. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on (571)- 272-1957. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

6.3. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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